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CONTENTS

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THE STRUCTURE AND POLICY IMPLICATIONS OF NIGERIA'S EXTERNAL TRADE 1960-1984.

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1. Introduction

The current state of the Nigerian economy can be traced to her structurally dependent trade relations with her major trading partners: the Industrial Countries. This dependency, largely unidirectional, has fashioned the structure of resource allocation, domestic production, direction of exports and origin of imports. Structurally, primary products, essentially crude oil, and agricultural products dominate the export market. Export of manufactures is relatively insignificant. Nigeria imports are mainly consumer, intermediate and capital goods. It is pertinent to note that the volume of trade with Africa and other developing world is very low. Therefore the tradition of using price elasticities in econometric analysis of international trade has generated a lot of controversies when applied to the Nigerian economy in particular or the LDCs in general.

Some argued that the import demand and export supply of LDCs are independent of price elasticities; Chenery and Strout (1966), Maizels (1968), Houthakker and Magee (1969). Johnson (1958) showed that income elasticities are at least as important in growing economies. Kahn (1973) and Kuburse (1974) showed that the LDCs import demand functions and their export supply function depend significantly on price elasticities. A particular evidence to this assertion is the work of Achi (1980) in which he demonstated the important role of price and income elasticities in the Cote d'Ivoire external trade.

Following Achi (1980), this paper evaluates the policy implications of the Nigeria's external trade structure in a simultaneous equilibrium and disequilibrium framework of prices, imports and exports volumes, for the period 1960-1984.

However, a major difference exists in the assumptions underlying the dynamic export model. This paper contends that there are certain limitations to a formulation in which, in a dynamic setting changes in quantity exported are expected to respond positively to the excess demand and price changes adjusting to excess supply.

Reconsidering the theoretical analysis of the determinants of export, an alternative dynamic structural export model is provided. Just as in Moran (1988), we posit that quantity exported is positively proportional to excess supply and that export price adjusts partially to excess demand. It could be argued that in a persistent disequilibrium framework, in which Nigeria has found herself, quantity exported should be expected to be influenced by domestic supply factors.

The task of this paper is multifold. Firstly, static and dynamic structural models are specified. Secondly, their parameters are estimated using the OLS technique in the first instance followed by the 2SLS technique. The latter technique takes into consideration the simultaneity in the demand and supply factors and thus provide more efficient estimators. Thirdly, comparative static analysis is carried out on the reduced form matrix indicating the impact of a change in a predetermined variable on an endogeneous variable, ceteris paribus. Lastly, based on these empirical results, the paper enquires into policy implications of the Nigerian external trade structure.

The paper is arranged as follows: In secion 2, we discuss the models. Section 3 presents the empirical applications while section 4 presents the policy implications of the results and finally, section 5 concludes.

2. Import and Export Models

Our initial assumption is the existence of equilibria in both import and export markets. In this setting we are hypothesizing the absence of lagged effects of certain variables such that there is instantaneous price adjustment to attain the equilibrium level which ensures that the adjusted quantity equates demand to supply.

In the dynamic framework, the predetermined variables include lagged dependent variables. Thus the equations can be seen as a partial adjustment model or a geometric distributed lag (Koyck (1954)). In this formulation, we are hypothesizing that only a proportion of the desired quantity is realised during the given period Gujarati (1979 pg. 255).

2.1 Static Import Model

Consider the import market and suppose that the forces of demand and supply prevailing will determine the actual quantity exchanged at the equilibrium price level.

We assume that import demand is a function of national income, the import price and the domestic price levels. As Turnovsky (1968) we admit that the foreign exchange earnings from export play a major role in financing the import of goods and services. Hence, current export is included in the equation as an explanatory variable. Thus, the import demand equation is specified, assuming non-linearity between the dependent and the explanatory variables, as follows:

$$M_t^d = a_o.(PM/PD)_t^{a_1} . Y_t^{a_2}. X_t^{a_3} . {}_tV \qquad .....(2.1)$$

where M_t^d : volume of imports demanded

PM_t : price index of imports

PD_t : domestic price index

Y_t : GDP at constant 1980 prices

X_t : Volume of exports

V_t : Stochastic random term

t : time period in years

a_0, a_1, a_2 and a_3 are the structural parameters.

written in the double-logarithmic form, equation (2.1) becomes

$$LnM_t^d = Ln\, a_0 + a_1\, Ln\,(PM/PD)_t + a_2\, Ln\, Y_t + a_3\, Ln\, X_t + e_t \quad ..(2.2)$$

and $e_t = LnV_t$ which satisfies the OLS assumptions. In this specification, a1, a2, a3 are the import dfemand elasticities with respect to relative prices, the real income and volume of export respectively. The predictions of thier signs are such that

$a_1 < 0,\ a_2 > 0,\ a_3 > 0.$

Factors that affect import supply will depend on the prevailing factors in the rest of the World i.e. in the markets that export to Nigeria. One of these factors is the import prices; at a higher import price, it would be advantageous to sell to us. Again, higher world price, as measured by the World Consumer Price Index, will discourage import to the Nigeria market. The capacity to supply depends also on the level of economic activities in the rest of the World (R W). We assume that in the absence of production constraint in the RW, supply to Nigeria will not be restrained. Finally, we hypothesize that the level of our Net foreign assets serves as a barometer of confidence for the RW. It may serve as refuge for the foreign suppliers in case of inability to pay for the imports.

The foregoing can be synthesized in a mathematical equation as below:

$$H_t^e = b_0 PH^{b_1} . WCPI_t^{b_2} . WPCI_t^{b_3} . NFA_t^{b_4} . V \quad ...(2.3)$$

which written in the double-logarithmic form gives

$$L_nMs_t = .L_nbo_t + b_1.L_nPM_t + b_2.L_nWCPI_t + b_3.L_nWPCI_t$$

$$... + b_4.L_nNFA_t + e_t \quad .....(2.4)$$

where

H_t^s : Volume of import supplied

$WCPI_t$: World Consumer Price Index

$WPCI_t$: World Per Capital Income Index

NFA_t : Foreign Assets deflated by PM

e_t : Random term such that $e_t = LnV_t$

The structural parameters of equation (2.4) are such that b1>0, b2<0, b3>0 and b4>0.

M_t^d : M_t^s and PM_t are the endogeneous variables in the system of equations (2.2) and (2.4). Thus estimating these equations can lead to the problem of indeterminacy (See Wonnacott and Wonnacott (1979), pg 274).

In addition, we assume that M_t^s is partially endogeneous.

We thus normalise equation 2.4. This procedure consists of assuming the coefficient of one variable as 1. The import price has been chosen as the normalising variable and equation 2.4 is thus rewritten with PM as the dependent variable (see also intriligator, (1978), page 43).

$$LnPM_t = co + c_1LnM_t^s + c_2.LnWCPI_t + c_3.LnWPCI_t + c_4.LnNFA_t + e \quad .(2.5).$$

In this case c1<u, c2>0, c3<0 and c4>0.

At equilibrium, $M^d = M^s = M$ and equations (2.2) and (2.5) can be estimated simultaneously to obtain the estimate of the parameters. For a comparative static analysis, the reduced form of the two equations can be obtained. The solution of the system is given in matrix form below:

$$Z_M = h.A_M H_M \quad .....(2.6)$$

where

$$Z_M = (L_nM_t \; L_nPM_t)'$$

$$H_M = (1 \; LnPLD_t \; LnGDP_t \; LnWCPI_t \; LnWPCI_t \; LnNFA_t \; LnX_t)'$$

$$[(a_o + al.co) \; a1 \; a2 \; al.c2 \; al.c3 \; al.c4 \; a3)]$$

$$hA = h_M [(co + ao.c1) \; a1.c1 \; a2.c1 \; c2 \; c3 \; c4 \; a3.c1)]$$

$$h = 1/(1 - a1.c1).$$

2.2 Static Export Model

Assuming that the demand for Nigerian exports depends on the relative price of export to the world price and the level of world income. Written in the the logarithm form, the specification is as below:

$$LnX^d_t = fa + f1.Ln\,(PX/WPX)_t + f2.LnWGDP_t + e_t \quad ...(2.7)$$

Where

X^d_t : volume of export demanded

PX_t : export price index

WPX_t : Index of World Price of Exports

$WGDP_t$: World Real Income

e_t : random term

As seen in subsection 2.1, f1 and f2 are relative price and income elasticities of export demand. These parameters are such that f1<0 and f2>0.

Similarly, Nigerian export supply is determined by the relative export price to domestic price level and by the domestic productive capacity. It is specified as follows:

$$LnX^s_t = g_o + g_1.Ln(PX/PD)_t + g_2 Ln\,GDP_t + e_t \quad .....(2.8)$$

Where

Xs_t : Supply of export in volume

PD_t : domestic price index

PX_t : export price index

GDP_t : Index of domestic production capacity

with g1>0 and g2>0.

Normalising equation 2.8 by the export index, it follows:

$$LnPX_t = wo + w1.LnX^s_t + w2.LnGDP_t + w3.LnPD_t + e_t \quad .....(2.9)$$

with w1>0 w2<0 and w3>

Solving the equilibrium model given by equations (2.7) and (2.9), we obtain the reduced form which is written in matrix form as:

$$Z_x = h.A_x \quad H_x$$

where

$$Z_x = [LnX_t \quad LnPX_t]1$$

$$H_x = [1 \quad LnWPX_t \quad LnWGDP_t \quad LnGDP_t \quad LnPD_t]1$$

$$h.A_x = \begin{matrix} [\, f_0 + (f_1.w_0) & f_1 & f_2 & f_1.w_2 & f_1.w_3\,] \\ [\, w_0 + w_1.f_0 - w_1 f_1 & f_2.w_1 & w_2 & w_3\,] \end{matrix}$$

$h = 1/(1 - w_1.f_1)$

In summary, taking into consideration the demand and supply factors, equations (2.2) and (2.5) constitute the equilibrium import model and equation (2.7) and (2.9) make up th equilibrium export model.

2.3 Dynamic Import Model

The four equilibrium equations (2.2), (2.5), (2.7) and (2.9) can be described as long-run equilibrium relations and represent the basic structural import and export models. Because of the short-run disequilibrium in both sectors, lagged dependant variables were included in the models. For factors underlying these dynamic specification see Intriligator (1978 page 176). We assume in the import sector that quantities imported respond positively to demand conditions and that import prices adjust to excess supply. i.e.

$$\Delta LnM_t = z[LnM^d_t - LnM_{t-1}] \quad \text{.....(2.11)}$$

$$\Delta LnPM_t = y[LnM^S_t - LnM_t] \quad \text{.....(2.12)}$$

where is the first difference operator, $0<z<1$ and $y>u$. z and y are coefficients of adjustments.

The estimable import demand equation can be obtained by substituting (2.2) into (2.11), thus;

$$LnM_t = a0' + a1'.Ln(PM/PD)_t + a2'.LnGDP_t + a3'.LnX_t + a4'.LnM_{t-1} + 0_t \quad \text{.....(2.13)}$$

with $a0' = zo.ao$; $a2' = z.a2 > 0$; $a1' = z.a1 > 0$

$a3' = z.a3 < 0$; $a4' = (1-z) > 0$

and $u_t = e_t - p.e_{t-1}$

And similarly, the import supply equation can be obtained by substituting (2.4) into (2.12) leading to:

$$LnPM_t = co' + c1'.LnWCPI_t = c2.LnWPCI_t = c3'.LnNFA_t + c4'.LnM_t = c5'.LnPM_{t-1} = V_t \quad \text{.....(2.14)}$$

where

$co' = h.y.bo$; $c1' = h.y.b2 < 0$; $c2' = h.y.b3 > 0$

$c3' = h.y.b4 > 0$; $c4' = -h.y < 0$; $c5' = h > 0$

$V_t = e - p.e_{t-1}$; $h = 1/(1 - y.b1)$

Equations (2.13) and (2.14) constitute the dynamic import model which can be solved simulatenously to give the reduced form equations for comparative static analysis.

2.4 Dynamic Export Model

As argued in section 1 of this paper, we assume that export quantities respond partially to suppliers desire or ability to increase exports and that export prices adjust partially to excess demand.

$$LnX_t = p[LnX^S_t - LnX_{t-1}] \quad \text{.....(2.15)}$$

$$LnPX_t = q[Lnx^d_t - LnX_t] \quad \text{.....(2.16)}$$

with p and q being adjustment coefficients and are such that $0 < p < 1$ and $1 > 0$. Equation (2.15)

emphasizes the importance of domestic factors in the determination of export quantities (see Drapper 1985, Winter 1985). Equation (2.16) accounts for the slow adjustment of prices to excess demand resulting from contracts or delivery lags which may prevent instantaneous adjustment of prices to excess demand even if there are no constraints on domestic production Moran (1988).

By substituting (2.8) into (2.15) and (2.7) into (2.16), we obtain the following equations:

$$LnX_t = A0 + A1.Ln(PX/PD)_t + A2.LnGDP_t + A3.LnX_{t-1} + U_t \quad \text{.....(2.17)}$$

where

$A0 = p.go$; $A1 = p.g1>0$

$A2 = p.g2>0$; $A3 = (1 - p)>0$

and $U_t = e_t - p.e_{t-1}$

$$LnPX_t = B0 + B1.LnWCPI_t + B2.LnWGDP_t + B3.LnX_t + B4.LnPX_{t-1} + V_t \quad \text{.....(2.18)}$$

Where

$B0 = h.q.fo$;

$B1 = h.q.f1>0$; $B2 = h.q.f2>0$

$B3 = h.q<0$; $B4 = h>0$

$h = 1/(1 - w1.f1)$; $V_t = e_t - p.e_{t-1}$

From the above, equations (2.17) and (2.18) constitute the dynamic export model which can be solved for comparative static analysis.

3. Empirical Applications

3.1 Methods of Estimation and Data Sources

Very often, the conventional approach in trade analysis is to use the OLS technique to estimate structural parameters of a single import (export) price or quantity equation. there is the likelihood that the estimated parameters are biased and inconsistent. This suspicion is evident given the interaction between demand and supply factos in both sectors. We have thus, in addition to the OLS used the 2SLS.

On the other hand, the separability of the two sectors is assumed. Our contention is that external demand factors determine the supply of our exports which is turn determine our imports. Such a relationship was described as recursive by Achi (1980). Hence, in this paper, import and export are not structured within a simulatenous framework.

Except the foreign asset, NFA, all the data used in the empirical analysis were obtained from the International Monetary Fund and International Financial Satisics, Year book 1986. Data on NFA were obtained from the Central Bank of Nigeria, Economic and Fiancial Review; various issues.

3.2 Empirical Results

The results of the estimation are provided in tables 1 and 2. In table 1. equation (3.1) and (3.2) are the static equilibrium equations and (3.3) and (3.4) are dynamic equations estimated by OLS method. Equations (3.5) - (3.8) are equilibrium and dynamic equations estimated by the 2SLS method. Table 2 is analogous to table 1. In all, twenty four equation were estimated, though sixteen are presented.

It is the tradition to choose the equation whose coefficients least violate the a priori sings and magnitudes (Thursby et al, 1983). In addition, the adjusted R2; the standard error, SE; the fisher's Statistic; the Durbin - Watson or the Durbin - H statistic will be used to discriminate between alternative specifications and techniques in this paper.

Table 1: Import Model Estimtes

	OLS	sdjR²	DW	F	S.E.	Durbin H
3.1	$M^* = -111.3617 + 33.7961\ GDP^* - 0.0322\ (PM/PD)^* + 0.472EX^*$ (1.1781) (0.1844) (2.5430)	0.746	1.326	24.52	21.09	-
3.2	$PM^* = 3.2739 - 0.0009M^* + 0.3023NFA^* + 1.3264\ WPCI^* - 1.5283\ WPCI^*$ (0.6753) (8.3554) (14.2877) (2.9732)	0.978	1.260	261.6	0.149	-
3.3	$M^* = 307.1413 + 0.5579ML^* - 32.2501\ GDP^* + 0.2462(PM/PD)^* + 0.5451X^*$ (3.7310) (1.1243) (1.5668) (3.6958)	0.043	1.754	33.19	22.77	0.923
3.4	$PM^* = -0.6326 - 0.0016M^* + 0.2077NFA^* + 0.403WCPI^* - 0.0284WPCI^* + 0.5613PML^*$ (1.9202) (7.6045) (2.4773) (0.0707) (5.8870)	0.922	1.648	568.39	0.092	1.001
	2SLS					
3.5	$M^* = -139.8161 + 35.8979\ GDP^* + - 0.4780X^* - 0.1099(PM/PD)^*$ (1.3554) (2.8311) (0.6317)	0.772	1.339	28.09	20.75	-
3.6	$PM^* = 13.7516 - 0.3396NFA^* - 2.8241M^* + 1.2209WPCI^* - 0.0529WPCI^*$ (10.8309) (3.2825) (14.9586) (0.0894)	0.985	1.278	396.08	0.122	-
3.7	$M^* = 180.5018 + 0.4784ML^* - 13.5612\ GDP^* + 0.1833(PM/PD) + 0.4681X^*$ (3.0903) (0.4648) (1.0601) (3.0708)	0.816	1.604	27.91	18.58	1.566
3.8	$PM^* = 4.0090 - 0.2112NFA^* - 0.0483M^* + 0.3938WPCI^* + 0.1994WPCI^* + 0.5627PML^*$ (8.421) (2.6358) (2.5491) (0.4980) (6.3308)	0.993	1.616	658.56	0.086	1.073

N.B. Figures in parenthesis are t-statistic.

* indicates the natural logarithm of the variable

Table 2: Export Model Estimates

OLS	adjR²	DW	F	S.E.	Durbin H
3.9 $X^* = -509.7506 - 0.5776(PX/WPX)^* + 216.1766WGDP^*$ (4.5559) (6.9694)	0.676	0.507	26.03	25.45	-
3.10 $PX^* = -3.9292 - 0.0095X^* + 0.7081PD^* + 2.0863GDP^*$ (3.6997) (4.1229) (4.1960)	0.945	0.870	137.12	0.28	-
3.11 $X^* = -66.8978 + 0.4320XL^* + 76.1712\ GDP^* - 0.326(PX/PD)^*$ (2.0702) (2.6518) (1.8558)	0.695	1.005	19.20	24.71	np
3.12 $PX^* = -0.4523 - 0.0041X^* - 0.5451WGDP^* + 0.9414PXL^* + 0.2854\ WCPI^*$ (1.1278) (0.3521) (5.2994) (0.3808)	0.958	1.683	139.14	0.24	1.721

2SLS

3.13 $X^* = -545.60 - 0.6151\ (PX/WPA)^* + 223.6105\ WGDP^*$ (4.4665) (6.7976)	0.670	0.725	25.33	25.69	-
3.14 $PX^* - 18.2469 + 0.7380PD^* - 4.2996X^* + 2.0112GDP^*$ (4.040) (3.2109) (3.7289)	0.939	0.733	123.09	0.295	
3.15 $X^* = -70.3566 - 0.3594(PX/PD)^* + 0.3703XL^* + 83.2250GDP^*$ (1.9611) (1.7969) (2.8576)	0.881	0.907	18.11	25.24	np
3.16 $PX^* = -14.3830 + 0.541WCPI^* + 2.9616X^* - 1.3416WGDP^* + 0.9539PXL^*$ (0.6863) (1.4384) (.07570) (5.4777)	0.960	1.77	144.54	0.24 1.	160

N.B. Figures in parenthesis are t-statistic. np means calculation impossible
* indicates the natural logarithm of the variables.

In table 3, the coefficient and speed of adjustment are shown. They are relative to both quantity and price of import and export obtained from the two techniques of estimation.

Finally, tables 4, 5 and 6 contain the impact multipilers obtained from the reduced form equations designed to give the rate of change of the equilibrium values when there are changes in the exogenous variables.

3.3 Discussions

3.3.1 The Import Sector

First, observe the quality of the regression. In all the eight equations, the adjusted R2 shows that 75% of the variation in the dependent variables are explained by the regression. It is even as high as 99.3% (see equation (3.8). The standard errors of regression, SE, were equally small. In the cases of the dynamic equations, where lagged dependent variables were incorporated into the models, the Durbing - H Statistic was used to detect the presence of auto correlation of errors. Given the calculated Durbin - H values, we concluded that there is absence of autocorrelation of errors.

At the level of 5%, the calculated F - statistics shows, very significantly, that the coefficientsa of all the equations are jointly different from zero. Hence we conclude that our structural models for the Nigerian Import are corretly specified and could be used to analyse that sector of the economy.

(a) The Demand Side

Equations (3.1) and (3.5) are the import demand functions in the static equilibrium framework. The coefficients of the explanatory variables have the correct signs and the magnitudes are plausible. The estimated coefficients are equally consistent, in both signs and magnitudes, between the two techniques of estimation, with the 2SLS having a little edge over the OLS. In the dynamic model, (3.3) and (3.7), certain coefficient notably, the GDP and the relative price, PM/PD, carry the wrong signs, the magnitudes are plausible although they are insignificant in the statistical sense at the level of 5%. Hence, our choice of model is equation 3.5 in the import demand market.

It follows then from equation (3.5) that a 1% rise in capacity to export, X will increase our import demand by about 0.5%. In effect, for every naira exported only about 50k return to the country in form of import of goods and services. This estimate strongly confirms, if even not slightly underestimates, the reality of the Nigerian economy. In effect, the remaining 50k might have been spent to service our foreign debt, constitute our foreign reserves or part of the private exporter's income that were not repatriated back into the economy.

The equation also shows that a 1% rise in the relative price PM/PD will lead to 0.1% fall in imports. Note that the coefficient is not significantly different from zero at the level of 5%. This result confirms evidence from the literature that price-elasticities do not influence the determination of imports of LDCs. Houthakker and Magee (1968).

Income-elasticity of demand for import is very high, showing that the import function is perfectly elastic. That the coefficient is insignificant may be due to the presence of export variable, X, in the regression which is highly correlated with the GDP. When X was removed from the equation, the performance was poor and the coefficient of GDP was biased. In that case, we concluded tha the model is mispecified. Returning to our equation, for a 1% rise in GDP. Import will rise by abut 34%. If this coefficient were to be statistically significant, then it confirms the high dependency of the Nigerian economy on import of intermediate, capital and consumer goods. We noted that Achi (1980) obtained similar results for his import demand equation.

(b) The Supply Side

Equations (3.2) and (3.6) are the import supply function in the static framewok. The 2S:LS estimate of the import supply presents a better fit than the OLS estimate i.e. equation (3.2) (see the statistics).

The Net Foreign Assets elasticity of import supply is used to determine the degree of confidence foreign suppliers have in the economy. The coefficient of this variable is positive and statistically discernible at the level of 5%. This implies that a higher level of NFA will build more confidence in our trading partners and this psychological state can result in higher import prices. The sign of the coefficient reflects the reality of the structure of the Nigerian external trade. In effect, the Nigerian economy has sijnce the early 70s being depending

heavily on the export of crude oul which has enabled the country to build-up a reasonable stock of foreign assets. And this has enabled us to import heavily too. (see equation (3.5)). Hence, higher NFA has lead to higher import prices, since our partners believe that we can afford to pay.

Similarly, the coefficient of import vatiable in equation 3.6 is negative and very significant. It shows that import supply is elastic and that the rest of the world has benefited in our "oil boom" by fixing higher import prices. A 1% rise in import will bring about 2.82% fall in import price.

An increase of 1% in the World Consumer Price Index, WCPI, increase Nigeria Import price, PM, by about 1.2%. This shows that higher inflation in the rest of the world will be transmitted into the Nigeriazn domestic economy through the import prices of goods and services. hence, a higher domestic inflation, then aborad, due to international transmission of price mechanism.

The sign of the coefficient of the World Per Capital Income, WPCI, is negative but not statistically different from zero at the level of 5%. This measn that WPCI does not influence the price of our imports and hence the supply. If it is discernible at this Y level of 5%, it means that higher WPCI will increase consumption abroad and hence a fall in supply of our imports.

In the dynamic setting, we retain the OLS estimate, equaion (3.4), because the coefficient of WPCI has a wrong sign in the 2SLS estimate. (see equation 3.8). all other coefficients are statistically significant at the level of 5% except the coefficient of WPCI. From Equation (3.4) the short-run and long-run elasticities of the variables can be calculated. In effect the long-run import elasticity is given by 0.0016/(1 - 0.5613) i.e. 0.0036.

From the above discussions, the following conclusions can be drawn about the structure of the Nigeria imports. The estimated relative price elasticities in all the equation are less than unity. This shows that relative price has little effect on the determination of the Nigerian imports. This corroboarates the view in international trade, that import demand function in the LDCs are relative price inelastic.

On the supply side, equation (3.6), it is remarked that Nigerian import is influenced not only by world prices but by level of world production.

We have equally observed that import capacity is highly influenced by the level of export revenue.

3.3.2 The Export Sector

Table 2 presents the empirical results of the export sector. As remarked in sub-section 3.3.1, the estimated regression give good fits judging from the various statistics. It is however remarked that the D - W test of auto-correlation at the level of 5% lead to the rejection of nuli hypothesis in favour of the alternative that there is the presence of autocorrelation. In the dynamic equation where we implicitly assumed an autoregressive error term. The Durbin - H test was conclusive in only ne case (equation 3.16) i.e. no autocorrelation of errors. In equations (3.11) and (3.15), the Durbin- H statistic could not be calculated (see Gujarati 1979 pg. 269).

(a) The Export Demand Side

Consider the OLS and the 2SLS estimates of the export demand, (3.9) and (3.13). The estimaes are very close, suggesting that 2SLS technique has not brought about any significant modification in the estimated parameters. We concluded that the OLS estimators are consistent.

From equation (3.9) we observe that the coefficient are statistically significant at the level of 5% and have plausible signs. The relative price elasticity shows that relative - price influences the demand for our exports. This is however expected. This equation also indicates the extent of the degree of openness of the Nigerian economy. For a unit percent increase in world GDP. Nigerian export increase by over 216%. This result also lend support the view that the Nigerian economy is highly dependent and thus vulnerable to external shcok.

Recall the assumptions made for the dynamic adjustment in the export demand market. At short-run, we believe, demand for our export depend on external factors but in the long run, the export supply factors will play their own role.

From equations (3.11) and (3.15), it could be observed that the relative price PX/PD is statistically significant and has the correct sign. It shows that export demand is price inelastic which means that if our export price increases, foreign partners can shift their demand to other countries with lower prices.

The equations also show a high income elasticity of ecport demand. It indicates that the domestic productive capacity can respond with ease to rise in foreign dmeand for export.

(b) The Export Supply side

Again equations (3.10) and (3.14) are the static export supply equations. Though (3.10) has a better fit than (3.14), they both show that domestic price index influence significantly Nigerian export price. In addition they show that supply is income elastic. For a 1% rise in GDP, export price will rise by about 2.1%.

The estimated dynamic export supply function, (3.12) and (3.16) include World Price Index, WCPI, as well as World GDP. From equation (3.16), it follows that at the level of %%, the coefficients of WCPI* and WGDP* are not statistically discernible. i.e. these variables do not influence the determination of Ngeria's export price, though they have the correct signs.

In this specification only the lagged expoet price is statistically significatn in the usual sense. It shows that export price adjusts very slowly given a speed of adjustment of 0.05.

These estimates emphasize the vulnerability of the Nigeria's export sector to changes in international demand factors and domestic supply condition. The export demand is relative price-elastic both in the static and dynamic framework. The export supply is national income elastic in the statistic analysis whereas it is World Consumer Price Index inelastic in the dynamic framework through insignificantly in the usual statistical sense.

4. Policy Implication

The commodity composition of Nigeria's exports is very restrictive, comprising mainly of crude oil, agricultural and few manufactured items. The crude oil exports depends on the DPEC quota ceiling - which itself is a function of demand conditions in the importing countries - and on international non-economic factors.

In the non-oil sector, agricultural export is determined by weather conditions and supply factor rigidities in the short-run. It is observed that the proporrtion of agricultural export in the total export has been falling since the 1970s. Exports of manufactures are in a small range of commodities for which there is slow world demand, keen price and product competition and rigid domestic factors especially when resource transfer to the sector is not adequately backed by financial policies. The cumulative effect of these factors is that Nigeria has no influence on world market price and has not escaped the instability in her export earnings generated by price fluctiations.

Nigeria's import can be classified into three categories: consumer, intermediate and capital goods. Whereas the last two categories constitute non-competitive imports for which we have to import anyway, the former, consumer goods, are competitive imports for which local substitutes are available although the country have been increasing the import of these goods over the years despite the potential for a viable substitution industries.

Given these characteristics of the Nigerian external trade sector, the estimated regression results obtained from the model generate the following policy arguments.

Our results suggest that devaluation as a corrective measure to the country's balance of payment difficulties may have contractionary effect. In effect, the Marshall - Lerner condition is not verified since the sum of demand elasticities of import and exports is less than unity (i.e. $0.11 + 0.58 = 0.69 < 1$). Consequently, the small price elasticity of import demand, 0.11, the increasing import of capital goods and the limited import substitions potentials may lead to an increase in imports rather than a decrease. Similarly, devaluation will lead to higher domestic price which has a positive and significant effect on export price (see equation 3.10). The rise in export price will lead to export shortfall due to lose of market. In addition, equation (3.9) shows that the demand for Nigeria's exports is world income elastic and therefore devaluation may not improve our balance of payment. In the long-run, similar conclusion could be reached.

Because of her measured ability to significantly influence her prices (see equations (3.5) and (3.9), Nigeria should embark on non-pride incentives to promote import-substitution industries and stimulate export growth which could have feedback effect on domestic production and employment prospects. To

achieve this, the government efforts matched by adequate foreign economic and technical assistance must be sought to structure, restructure or strengthen the existing structure of production, consumption and trade.

Table 3 provides the speeds and coefficients of adjustments obtained from the dynamic import and export models. In the import market, we observe that the coefficient of adjustment of both volume and price of imports teds to equalise. It shows the extent to which our expectations about imports are realised within a period of one year. The speed of adjustment is estimated at about 0.44 for both volume and price. This finding confirms once again the dependency of Nigeria on imports.

In the case of export, recall that inthe dynamic framework, changes in export volume were assumed to respond positively to excess demand. Two interesting results were obtained fro table 3. Firstly, that there is slow response of export price and the adjustment coefficient is very high (0.94 and 0.95). The policy implication of this is that any attempt to increase Nigeria's export price will result in loss of her market given her position in international markets. Secondly, given an adjustment coefficient of about 0.57, the country can respond relatively quickly to higher demand for her export. This may be due to presence of unutilized production capacity especially in the oil sector and probably the existence of stock in the manufacturing sector.

Therefore our analysis under the assumption of dynamic adjustment shows that even in the long-run, Nigeria will remain a price taker for both her export and import, but can improve her export capacity provided the structure are turned towards that end.

Table 3. Speeds and Coefficients of Adjustments in the Dynamic Models

Estimation Technique/	OLS			2SLS	
	Sector	Speed	Coeff.	Speed	Coeff.
EXPORT	Volume	0.4320	0.5680	0.3703	0.6297
	Price	0.0586	0.9414	0.0461	0.9539
IMPORT	Volume	0.4421	0.5579	0.5216	0.4784
	Price	0.4387	0.5613	0.4373	0.5627

Source : Computed from Tables 1 and 2

Finally, we envisaged a comparative static analysis of our model by using the reduced form equations to evaluate the impact effect of a change in an exogeneous variable on each of the endogenous variables. The exogenous variables considered were WPCI, WCPI and DDP. Our results reinforced the original findings from our earlier analysis. From tables 4, 5 and 6, we could see that the impact of WCPI is higher in terms of magnitude than the others. This confirms the relative ease with which world inflation can be transmitted to the Nigerian economy through her imports. Similar result is obtained for a change in WPCI. From table 6, we could observe that the dependency of the Nigerian economy on both origing of her imports and destination of her export is again confirmed. In nearly all the cases, import and export prices were found to be inelastic.

Table 4. Impact of a change in WPCI on Import (Export) Volume and Import (Export) Prices.

Effect	Volume	Effect	Price	Effect
	ST	LT	ST	LT
Sector	i, WY	i,WY	pi,WY	pi,WY
IMPORT	33.95	52.28	0.25	0.329
EXPORT	47.20	70.45	0.33	0.62

NOTE: For ease of notation of WPCI is written as WY

ST measures the short term, ST, impact on
i, WY
i(=M or X) Volume of a unit change in World per Capital Income.

All other parameters are defined similarly.

(Notation adopted from Moran (1988)).

Table 5. The Impact of change in WCPI on Import Volume and Impact Prices.

Effect	Volume	Effect	Price	Effect
Sector	ST	LT	ST	LT
	i,WP	i,WP	pi,WP	pi,WP
IMPORT	-87.85	-133.15	0.91	1.20

For ease of notation, WCPI is shortened to WP

Table 6. The Impact of a change in GDP on Import (Export) Volume and Import (Export) Prices.

Effect	Volume	Effect	Price	Effect
Sector	ST	LT	ST	LT
	i,Y	i,Y	pi,Y	pi,Y
IMPORT	32.21	49.55	0.08	0.11
EXPORT	81.68	121.91	0.32	0.60

For ease of notation we denote GDP by Y.

5. Concluding Remarks

In this paper, an atempt has been made to model, estimate and inquire into the policy implications of the Nigerian external trade sector. Contrary to the conventional approach of single equation estimation under the assumption of equilibrium between demand and supply, this paper envisaged a simultaneous equations in which volume and price equations constitute the system. It provides quantitative evidences to support some qualitative assertions on the structure of Nigeria's external trade.

A number of observations have been generated by the models. (1) Relative prices have little effect on the determination of imports and exports. This corroborates the view in the literature that imports and exports demands are relative price inelastic in the LDCs. (see Houthaker and Magee 1969). (2) The growth of the world production and world prices influence the determination of import prices. This is also true for the export sector. (3) Capacity to import is highly influenced by export revenue (4) In the dynamic model our export demand is income-elastic whereas export prices is very slow, about 0.05, although higher for the import prices (6) Comparative static analysis of the models suggest that the growth of the Nigerian economy is very sensitive to growth in the world economy and world inflation rate.

These findings suggest some policy issues. Firstly, exchange rate adjustment through devaluation wil have little prospect for succes since the Marshall - Lerner condition is not verified. both short-run and long-run effects of such exercise will have contractionary effect on the economy.

Secondly, government will have to embark on non-price incentives to stimulate export, promoted import-substitution industries and thus reduce the excessive dependency of the economy on the external sector. Export price adjustment may inadvertently lead to market loss and/or price war since we are only one among several in the international market for our exports.

Thirdly, Nigeria will have to export more if she will meet up her import requirement in consumer, interediate and capital goods to sustain her economy. The marginal prospensity to "import out of export" is found to be 0.447; calculated at the mean value of 0.944 and an elasticity of 0.473. It follows then that the marginal propensity to "save out of export" is 0.553. This proporiton is probably due to high foreign debt servicing, accumulation of foreign reserves with the appropriate international institution or part of export earnings not repatriated back into the economy.

Finally, although the Nigerian economy will remain a price-taker, there is prospect for a substantial improvement in her export supply in the long-run given a seemingly excess capacity in some sectors of the economy: the oil industry.

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